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SATELLITE COMMUNICATION FOR SOCIAL DEVELOPMENT

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In all parts of the world, there are human needs that depend on organised health, education and community services, if they are to be met. These services require teamwork. Educators, medical personnel and community service specialists, persons often widely separated in distance, must interact, consult and share tasks. Often technologically supported services that are available only in remote urban centres are required in rural areas. The quality of service is affected by the lack of communications. Workers in the social services need low cost telecommunication systems that can extend service anywhere and permit interactive transmission of voice and print among colleagues and professional centres.

Small nations, in particular, cannot develop comprehensive health and education services without drawing on information resources from outside the country. In the large industrial nations as well, when institutions and professionals are remote from centres of information and expert knowledge, standards of service are affected. The best financed university or clinic cannot presume to all knowledge, and needs to maintain co-operative relationships.

The world's telecommunication systems have been planned and developed for commercial and military purposes; very little attention has been given to communications for social services. It is usually assumed that health, education and community organisations should adapt to the communication systems already developed for other purposes. Consequently doctors, educators, librarians, researchers and other specialists often go without. Commercial telecommunications depend on the market economy and growth in the sparsely populated or low income areas of the world is necessarily limited. This is the very part of the world most badly in need of development. Social services there cannot become effective without outside aid which must be integrated with local work processes. The practical nurse, for example, cannot predict where she will require the assistance of the doctor who may live hundreds of miles away.

PEACESAT

The PEACESAT Project was undertaken to apply the inherent capacity of the satellite for global communications to the task of social problem-solving. The technical system was designed so that global communication could be established quickly and cheaply from almost any point in the world. A communication satellite is used for conferencing in many locations over great distances. The system is highly flexible and mobile and permits two-way communication by voice, pictures, print, facsimile and teletype, as well as linking computers to terminals for purposes of information exchange.

PEACESAT refers to the Pan-Pacific Education and Communication Experiments by Satellite, an international educational experiment in which institutions in 12 nations of the Pacific Basin are linked by satellite for information sharing. Specialists and community leaders and other people, with responsibility for social welfare problems, can be linked with colleagues and information banks.

Preparation for the project began in 1969. Transmission in April, 1971, between Hilo and Honolulu, Hawaii, marked the first use of satellite for intrastate communications in the United States.

A university class in June of that year was the first education course for credit to be taught via satellite anywhere in the world. An experiment connecting University of Hawaii libraries was the world's first library networking by satellite. When Wellington Polytechnic (New Zealand) and the University of Hawaii began their educational exchanges in December, the first international educational satellite network was initiated. Beginning with the involvement of the University of the South Pacific (Fiji) early in 1972, a regional network was demonstrated for the first time.

A rudimentary experimental system for satellite communication has been developed. Over a four year period there have been 3,000 hours of structured communications among people, usually strangers, separated geographically but with shared objectives. The system, if adequately funded, could provide communication resources to participating institutions in quality, flexibility and range, superior to those enjoyed today by the top executives of the most advanced countries.

In our opinion, after some four years of experience, a world-wide system using the Peacesat approach is feasible - technically, economically, politically and functionally. It could help to extend the benefits of science and education and gain great returns from the enormous investments in trained manpower and in organised efforts to improve man's condition.

Telecommunication Systems - a comparison

There are three general types of international telecommunication systems for non-military purposes; common carrier, mass media and service systems, such as air safety and navigation. The Peacesat system would be grouped with the third. The Peacesat approach complements the common carrier system since it stimulates social and economic development and with it the traffic of the international common carriers. It is not a mass media system and it has none of the intrusive qualities which are feared in a system which beams television programmes across national boundaries directly to receivers.

By briefly comparing three applications of communication satellites, the uniqueness of this service support application is revealed. The first, and still the only regular civil application of satellites was understandably for international common carrier traffic. The Intelsat system uses high capacity satellites which need high cost ground terminals. The Intelsat system terminal in Nonolulu, for example, represents an investment of US$ 14 million. These sophisticated terminals are linked to existing telephone and telegraph systems and along with underwater cable systems provide international connections for telephone users and others. Their function is quite different from a US$15,000 Peacesat terminal installation designed for low traffic with perhaps five voice circuits rather than several thousand. However, in our view, the small terminal is better for the purposes intended.

The mass media application is represented by NASA's ATS 6 satellite. The ATS 6 is the experimental satellite used in the US Rocky Mountain experiments during 1974, now active over India. In this application, one or perhaps a few ground terminals send TV pictures to the satellite where they are relayed to receive-only ground terminals and from there relayed

distributed to TV sets. The very high cost of preparing and transmitting materials must be justified by "economies of scale". This means mass audiences and a large investment in ground terminals. Individually, these receiver terminals may cost US$1,000-US$2,000, but of course, tens of thousands of television sets are required to bring unit costs to acceptable levels. The purpose of the mass media system is generally to change the behaviour of large numbers of people. This application of satellites is enormously expensive, possibly too expensive, to become a regular service anywhere for some decades. But again, the important point is that it is not designed to support the social services.

In the Peacesat concept, small low-cost ground terminals send and receive voice grade signals using a satellite relay which broadcasts the signal over a wide area - one-third of the earth's surface. Institutions may make membership arrangements. Membership is limited to education, health and community development organisations. Interaction among peers is the primary function. The institutions serve as the gatekeepers and since inter-connection is with comparable institutions the communication processes are designed for and limited to the purposes for which the institution is organised. The ownership and operation of protection against cultural imperialism since a local hand is on the off-on switch. Costs which range from US$5,000-US$50,000 for a terminal and related facilities are within most institutional budgets.

However, the costs in space are another matter. A three to five exchanges on Peacesat have included in-service training of nurses, consultation among doctors and emergency communications. For over three years an experiment in epidemic control has assisted researchers and practitioners, deployed over the Pacific, and engaged in an organised fight against dengue fever which has moved North in the Pacific from New Caledonia. Often fatal and without known cure the disease has become a serious problem? Individuals and teams are able to co-ordinate action during regular staff meetings via satellite.

Better health care is a top priority for individuals and national leaders, particularly in developing nations. International action is acceptable. Where populations are sparse and scattered, it becomes necessary to consider world regions as medical service units. New Zealand and United States' authorities are moving in this direction in the Pacific. There is no question that the Peacesat approach can provide excellent medical communication and immediate social benefits. The satellite communication system would perform as intercom unit for the whole Pacific Basin in the same way that individual medical clinics and health centres are wired for teamwork and greater efficiency.

Network users

The most important experimental project thus far is the University of the South Pacific regional education network to link Extension Centres, newly established in a number of South Pacific island nations. The University of the South Pacific is an important innovation itself, one of the two multinational universities in the world. The extension courses and tutorials via satellite provide services to students in member nations and are critically important to the university and to the future of higher education in the region. Currently USP schedules eight hours a week of satellite time. This could be tripled immedia-

tely if more time were available. The Carnegie Corporation of New York has been the primary source of support, with additional assistance from Unesco.

Other higher education network projects have been proposed as an outgrowth of successful experiments, among them a New Zealand based Continuing Medical Education Network to include five island nations. A successful two-year experiment in joint teaching and administration of course work involving the students and staff of three universities in three nations, points to the feasibility and desirability of an international higher education network. Community Colleges are being developed in the Pacific and a network experiment involving institutions in the US Pacific is being discussed.

A regional news experiment initiated by the South Pacific Commission uses the system to involve reporters of half a dozen nations in a news round-up. They supplement the world news provided by the radio services of the major powers with regional news and the experiment promises to fill a major gap. Reporters in the experiment present local news of interest to the region and then respond to questions put to them by the reporters at other terminals.

A community network arrangement is being tested by small national terminals. Participation is limited to terminals located in very small countries without metropolitan centres or institutions of tertiary education. Their populations range from under 4,000 to over 80,000 persons. Before the Europeans entered the Pacific, we are told, there was more communication between islanders than exists today. Now communication is motivated by the money economy and involves people associated with industry and the trade structure. The purpose of this network is to strengthen cultural foundations so that special emphasis is placed on interaction among non-specialists and among indigenous interest groups. Can a basis for communication be developed and will any value come of the exchanges? It is too early to answer.

Satellite inter-connection of public, academic and special libraries in the Pacific to facilitate inter-library loans would mean that collections can be enlarged without accompanying costs of acquisition, classification and storage. During the first year, successful experiments were carried our involving University of Hawaii libraries separated by water. Later a satellite conference among 22 libraries in the Pacific Basin produced an agreement on a library experiment. A plan has been developed in which the satellite system will be used for inter-library loan requests with response by facsimile transmission or airmailed microfiche. Library traffic is not so great that it will sustain an independent, long-distance transmission system. However, it is evident from these conferences that professional librarians are ready for such an experiment.

Links between emerging legislative reference bureaux to give new nations information on law making is being discussed. Political and economic leaders can then be more easily aware of experiences in public policy elsewhere and avoid when possible the mistakes of the past.

A number of exchange activities explored possible functions of a science and technology network. System use in developing public awareness was tested when interested audiences were assembled at terminal locations in the South Pacific to participate in an extended

science lecture series originating from Honolulu. This series was scheduled also in six other cities of the United States, but the members of the remote Pacific audiences had an opportunity not afforded the US audiences when they questioned the experts in Honolulu. The Peacesat proceedings were broadcast by the National Broadcast Commission of Papua and New Guinea and reports carried in the Pacific press.

The result of several experiments in global conferencing among scientists have been gratifying. A group of New Zealand scientists had a mutually satisfying meeting with managers of the Earth Resources Technology Satellite programme at Goddard Space Center, Washingcton DC. One Australian scientist remarked that the information was six to nine months ahead of established report channels. In another exercise, scientists in New Zealand and Honolulu discussed technological transfers with others located in less developed areas. It is clear that both sides learned from these exchanges. Agendas had to be changed and the applications discussed often took a much different course from what was originally planned. "We learn what is relevant", is often the comment of urban participants when describing exchanges with remote areas.

The future of Peacesat

The diffusion of technology and its sensible application to existing human conditions is an urgent world-wide requirement. By combiding science networks with other desirable network activities, a sum of benefits will be obtained which will promote extension of the communication system and greater effectiveness when put to use.

Growth of the project is the result of three basic characteristics, in our opinion. First the technical design is adapted to existing conditions of life; major social changes are not needed and costs are manageable. Second, organisational design recognises cultural diversity with a high degree of local responsibility and discretion. And third, the system is related to discernible social benefits and to specific operational requirements. In most instances, the system promises communications that are unavailable without it.

The Peacesat Project has set in motion many varied international communication activities since 1971. While the satellite time has been provided by the National Aeronautics and Space Administration all activities on the ground have been initiated locally. The participating institutions own and operate all ground terminals and arrange for financing of operations. This dependence on relatively small, local initiative is entirely different from other educational satellite projects. Later projects have operated at budget levels 10 and even 100 times larger. In all, less than US$400,000 has been spent over five years on capital equipment and operations, none of it from US Federal sources. Since local effort is involved, continued committment to the project is an indication of the value of activities, in the judgement of those closest to the scene, the participants.

However, lack of resources has meant that we have been unable to get the most out of the opportunity provided by the ATS 1 Satellite. We have not carried out a number of important experiments or adapted and tested equipment in new environments and have lacked sufficient system management for best results. The project has survived, however, the only continuing educational satellite project, in addition to being the first.

Four years of action with this rudimentary system in our opinion justifies an extended experimental project under conditions which would permit effective long-range planning. More locations should be involved over a wider area, in Asia as well as the Pacific. Equipment and operations could be improved, and designed to serve better the needs of the social services. An extended pilot project is essential for determining requirements in cultures previously unserved by adequate telecommunications. A communication system should grow out of the operating habits, purposes and needs of potential users. The mass media and the one-way delivery system - broadcasting, video-tapes and audio-cassettes - have given industrial societies and urban centres enormous power for influencing the behaviour of the peoples of the world. However, the requirements of the social services and the world's trained manpower are not served by these communication methods alone. The need is for two-way communication which can be easily integrated into work processes. We hope that the Peacesat Project will stimulate the interest necessary to the development of a world-wide system that will meet this need.